

ABSTRACT

A method of electrochemically filling features on a wafer surface to form a substantially planar copper layer is provided. The features to be filled includes a first feature that is an unfilled feature with the smallest width and a second feature having the next larger width after the smallest feature. The first and the second features are less than 10 micrometers in width. The method comprises applying a first cathodic current to form a first copper layer on the wafer surface. The first copper layer has a planar portion over a first feature and a non-planar portion over a second feature. After a surface of the first copper layer is treated by applying a first pulsed current, a second cathodic current is applied to form a second copper layer on the first copper layer. The second copper layer has a planar portion over both the first and second features.